# NETHERLANDS
# EAST-INDIAN
# SAN-FRANCISCO-
# COMMITTEE.

DEPARTMENT OF AGRICULTURE
INDUSTRY & COMMERCE

## No. XXXII.

## Tanning Materials.

Dutch 201

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SAN-FRANCISCO-COMMITTEE

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# TANNING MATERIALS.

From the tans occurring in Netherlands East India some are used in the comparatively unimportant local tanneries and are not exported because the available supply is hardly large enough to meet the local demand, others are not, or only to a small extent, used by the local industry, and are merely of importance for the export.

The local tanneries in Java use mixtures of the bark of one *Acacia*, and one or two *Cassia* species; of late *Rhizophora* barks have also been included. However, as to the last mentioned category one has to look for more especially in the islands beyond Java. Mangrove forests cover those flat and muddy coasts which are subject to ebb and flood. They form a most peculiar vegetation, which in the Old World contains many more varieties than that of the New World. This vegetation is very remarkable in as much as those species which grow in the sea appear to stand on stilts, which are entirely immerged at high tide, so that only the fresh green tops appear above the water and make the coast look like a flooded forest. Huge areas are covered with these mangrove swamps which make the coast unaccessible, even at low tide, since the entangled roots and the muddy constitution of the soil practically prevent penetrating.

The botanical composition of these forests has been known exactly for twenty years or so; unfortunately this is not the case with the commercial value of the barks of the various species, notwithstanding the fact that hardly a month passes without more or less important articles being published on Mangrove barks. Considerable differences seem to exist between barks of the same botanical origin, in relation to the territories from which they are obtained, so that it is not allowed to generalize. Furthermore the vernacular names by which Mangrove trees are known in the Malay Archipelago are confused. They differ in various districts and are absolutely unreliable. If it is stated f.i. that in a certain district „Bakau putih" (White mangrove) is collected for export and that „Bakau merah" (Red

mangrove) is valueless, a statement from another district may be the reverse. So it is possible, and even probable, that trees mentioned in those reports and indicated by the same native name are of different botanical origin. The present writer believes that the mangrove bark of the Netherlands East Indian trade originates principally from the genus *Rhizophora,* of which two species, *R. conjugata, L.* and *R. mucronata, Lam.* prevail in this colony, together with *R. stylosa, Griff.* which is described sometimes as a variety, and sometimes as a true species. Others suppose that the bark is supplied more especially by the genus *Bruguiera,* which is represented by a more numerous number of species. Still others look upon the genus *Ceriops* as the botanical origin of the best mangrove barks of the trade, though the latter is known to produce a rather expensive dye. A thorough investigation — which would however be rather difficult and tedious — to find out which species are actually exported and which are the best, has not yet been made in Netherlands East India.

The bark is collected as follows. After having been examined, whether the bark has at least the thickness of a finger and can be easily removed from the wood, the tree is felled above the supporting roots. If the bark is too thin or cannot be easily removed the tree is left alone, there being plenty of others. The bark is subsequently cut into pieces and dried in the sun or over burning wood. The manner in which the bark is dried, irrespective of the possible different botanical origin, is responsible for great difference in appreciation of the *Rhizophora* barks. If, for instance, the bark is allowed to become wet by rain, the percentage of tannin decreases, and if insufficiently dried, the possibility prevails of undesired chemical changes. For long distance transport, the dried bark is broken into small pieces or even occasionally pressed. The mangrove barks exported from Netherlands East India appear to contain a comparatively small percentage of tannin, viz. 22 to 26 percent.

In the export statistics the barks of all Mangroves are classed together under one heading, including *Ceriops* barks with regard to which it is not certain whether they are collected for tanning purposes or not. The exports amounted to (in tons of 1,000 K.G.):

| Year | Acheen. | East Coast of Sumatra | Indragiri | Menado | Other districts. |
|---|---|---|---|---|---|
| 1908 | 57 | 4,744 | 1,552 | 1,670 | 30 |
| 1909 | 3,621 | 3,486 | 1,392 | 393 | 72 |
| 1910 | 2,881 | 2,360 | 1,868 | 1,573 | 151 |
| 1911 | 2,777 | 1,120 | 1,507 | 767 | 19 |
| 1912 | 3,312 | 4,162 | 2,591 | 238 | 51 |

The export figures are those for the whole districts, and do not specify the ports from which the bark is shipped, as these are for the greater part small unimportant places, all situated as far as the first districts are concerned on the North-East Coast of Sumatra.

The greater part of the exports is sent to ports in the Straits Settlements, in particular to Penang. The quantities shipped to these ports amounted to 7,051, 8,508, 7,903, 7,507 and 9,796 tons in the years 1908 to 1912 respectively. Of the Western markets, only Germany occasionally receives quantities exceeding 1,000 tons per annum.

Considering that tannin extracts are gradually supplanting barks, it is only natural that the tannin should be extracted on the spot, as by doing this, freight could be saved and barks containing a low percentage of tannin could be used, the more so as apparently the Netherlands East Indian barks are all more or less poor. On the other hand, if the tanning is extracted locally, only a comparatively small area can be worked in view of the difficulties of transport of the wet bark. Local extraction has therefore only partially been successful, and of the two factories in the Western Division of Borneo one has had to close down owing to exhaustion of the Mangrove forests situated in the close vicinity of the factory. The process of working in the remaining factory is partly kept secret, viz. as far as the mixing with other tanning material is concerned. The product is a dark brown solid mass with a shiny shell-like appearance on the fracture and contains according to a statement in a recent compilation, an average of about 50 percent of tannin on the air-dried cutch (containing

20 per cent of moisture) but often the percentage of tannin is as high as 70 per cent.

The export of this Mangrove-cutch from Pontianak amounted to (in units of one thousand guilders):

| Year | U. S. A. | Great Britain | Japan | Australia | Other countries. |
|---|---|---|---|---|---|
| 1908 | 16 | 193 | 6 | 1 | 1 |
| 1909 | — | 37 | 11 | 3 | 4 |
| 1910 | 84 | 58 | 5 | 18 | 1 |
| 1911 | 65 | 46 | 22 | 5 | 3 |
| 1912 | 152 | 77 | — | 3 | 10 |

It took a long time before all the prejudices against the use of Mangrove for tanning purposes had been overcome. Used by itself it produces a hard cracky leather and the bark or the extract has therefore to be mixed with other tanning materials. A further objection is that the dye, closely related to the tan, imparts to the leather an undesirable colour, and to avoid this it must be mixed with such other materials which either do not colour at all or only very slightly. Otherwise the tannin must be discoloured. Now it has been noticed that during a certain time of the year this dye is much less prominent than usual, and it has therefore been recommended to collect the barks only at the most favourable time; but those who recommend this apparently overlook the fact that the bark collectors also have to find their living during the remaining part of the year.

* * *

Where Mangrove barks are being used to a small extent for tanning purposes in Netherlands East India, this in not the case with yellow Catechu or Gambir. The latter is there merely a condiment, being one of the ingredients for betel chewing, which is enjoyed by both men and women in the East as generally as tobacco-smoking and chewing in the West.

Gambir is a shrub, or more correctly, a climbing plant which is however cultivated as a bush, without supports, to about a man's height. The Gambir cultivation is limited to Sumatra, the Malay Peninsular, Borneo and in between lying islands, and as regards Netherlands East India it is of particular importance in the Rhio-Lingga archipelago, where gambir is often grown in combination with pepper. Climatic influences have a great deal to do with successful cultivation of gambir. The climate must be damp with about 3,000 millimetres of rain per annum, regularly distributed throughout the whole year, and alternate bright sunshine. Such climatic conditions only prevail in the districts situated very near the Equator. For this reason, only Central Sumatra is suitable for this cultivation, and of the immense island of Borneo, only the Western part. The cultivation is only remunerative in low lying districts; more than 400 to 500 Metres above sea level the production of leaves is too small.

The cultivation is in the hands of natives and the Chinese; only in Sumatra and in the Western Division of Borneo are a few European gambir estates. The shrubs are planted at distances of 6 by 8 feet and, if the upkeep is efficient they begin to bear after a year or perhaps a little later. After this the leaves can be cut every six months. The weather has a great influence on the production; both too much rain and too long droughts have a detrimental effect. Under normal conditions planters in low lying parts anticipate a crop of 3 to 5 K.G. of leaves and twigs per bush per half year. A properly managed plantation produces during 15 to 20 years, but native plantation seldom reach such an age. Some only pay during 5 or 6 years, others 12 years. The Chinese estates however depend on the supply of fire wood, large quantities of which are used by them for the preparation of the product. When the quantity available within reach of the factory is exhausted, the factory has to be removed and this as a rule is the case before the value of the plantation justifies abandonment.

Harvesting is done by cutting the twigs—which reach a length of about 60 centimetres in six months—at 5 centimetres from the main branch. On European estates this is systematically done

like pruning with a view to benefitting the succeeding crop. Natives cut away three quarters of the number of the twigs. Not more is collected than can be immediately milled, as dry leaves do not contain any trace of gambir and even faded leaves are very difficult to manufacture.

There are various methods of extracting, which depend on the ultimate destination of the article, being either the gambir for Eastern consumption, or the gambir as it is known in Europa. The different methods of preparing gambir for human consumption — the native chewing material — can safely be ignored here, and we therefore confine ourselves to a description of the preparation of block and cube gambir by Chinese planters. The twigs immediately after having been cut are conveyed to the factory, which is built at the edge of the jungle (in view of easily obtaining firewood) and by preference not far from a brook. The factory consists of a primitive wooden house with a high roof. The ground floor serves as factory, the upper story as drying shed. The ground floor consists of hard clay. On, and partly in, the floor, an oven is built of bricks or clay upon which a large segment-shaped pan is placed. This pan, made of iron or brass and occasionally also of wood, is provided with a brim by placing a bottomless cask on the edge. Above this emerges a wide gently sloping gutter which can, by means of a movable pipe, be connected with a second cask intended for collecting the washing water. The extraction is conducted as follows: the leaves are twice boiled and after the second time, before being thrown away, washed with plenty of clean water. This washing water is collected in the water cask and being completed to a quantity of 180 to 200 litres, forms the starting point for the next boiling. When heated the leaves, which have had one boiling, are again put into the kettle for some time, after which they are transfered to the drain so as to allow the adhering extract to flow back. Then, 180 to 200 K. G. of fresh leaves are put into the boiling extract and pounded and stirred with a big stick of hard wood in order to bruise them. During the half hour that the fresh leaves are being boiled, the leaves which have already been boiled twice, are treated again. The working drain is

connected for this purpose with the water cask and clean water poured on the exhausted leaves, as has been told already. The refuse is then removed and. when the cultivation of gambir and pepper are combined, is used for fertilizing the pepper gardens. When the drain has been emptied the contents of the boiling pan are attended to, the leaves being taken out and drained during the following concentration process. The quantity of water which has to evaporate is 100 to 120 Litres and it takes 3 to 4 hours before the necessary concentration has been reached. When this is completed, the fire is extinguished, the extract is scooped out with a ladle and poured through fine sieves into small casks in which the surcharged solution is made to coagulate as soon as the temperature has fallen to 35° C. When crystallisation sets in the soft mixture is poured into wooden moulds, in which it sets in about twelve hours. After being removed from the moulds the gambir is cut to the required size and dried.

The product prepared in this manner is the product known by the name of block-gambir in the trade, and consists of the complete extract of the gambir leaves, without the addition of anything else, and also without anything being removed.

Block-gambir differs in this respect from cube-gambir, which is also extensively used in the Western markets, although it is much more expensive than block-gambir. Cube-gambir is really the product prepared by the Chinese for the Eastern markets. To understand the difference it should be remembered that the extract of the gambir leaves is principally composed of two related ingredients, catechine and catechu tannic acid, of which the first is the actual condiment, whereas the second is removed to a certain extent. The native methods of preparation yield a product which is much richer in catechine than that produced by the Chinese. Unwittingly, use is made of the difference in solubility of catechine and the tannin; the former is hardly soluble in cold water but easily so in hot water, whereas the tannic acid is also easily soluble in cold water. To produce cubes the gambir mixture is poured into moulds of a peculiar construction. These consist of a table, covered with a piece of

coarse cloth, e.g. jute, and provided with vertical detachable side boards. A part of the moisture containing a good deal of the tannic acid contains but very little catechine, drains slowly through the cloth, and the remaining mass consequently shows a high content of catechine. When the cake is well set, the vertical sides of the box are removed and the cake is cut with a string: the pieces thus obtained are further cut into cubes. These cubes are placed in the sun, or are dried in the coolest part of the upper story and gradually removed to warmer places. Premature heating would give a plastic mass, owing to the great solubility of catechine at high temperature. After a fortnight or so the cubes are sufficiently dry to be despatched.

The dry gambir produced by this Chinese method is constantly one-sixth of the weight of the cleaned leaves.

To prevent the cubes from losing their original regular shape whilst being dried and thereby becoming useless for Eastern trade (gambir is sold by pieces and not by weight in the retail trade) it is absolutely necessary to stir a small quantity of fine, sifted and — as a rule — roasted rice bran in the saturated mixture. The original shape is then retained and the product becomes more porous. The quantity of bran required is however small, 200 grammes of roasted bran to 10 or 15 Litres of mixture are sufficient. Large quantities, such as 20% and even 60% of bran which occasionally occur in gambir used for chewing purposes cannot be described as a necessary evil, but must be qualified as adulteration. Borneo gambir is also sometimes adulterated with yellow clay, a practice which has been very detrimental to the appreciation of the product. This adulteration is not however so much of a fraudulent character as a wrongly chosen means to keep going an industry, which is unremunerative when low prices are prevailing.

The production of gambir is very large, much larger than would appear from the export statistics, as local traffic is not included therein.

The direct exports, of which by far the greater part is produced by the Rhio-Lingga archipelago, amounted to (in tons of 1,000 K.G.):

| Year | U. S. A. | Belgium | Italy | Great Britain. | Singapore | Other countries. |
|---|---|---|---|---|---|---|
| 1908 | — | — | — | — | 7,434 | 78 |
| 1909 | — | 180 | — | — | 6,595 | 81 |
| 1910 | 161 | 1,164 | 180 | 80 | 5,407 | 337 |
| 1911 | 308 | 873 | 342 | 321 | 5,958 | 161 |
| 1912 | 56 | 2,214 | — | 112 | 8,100 | 169 |

The large quantity which Singapore receives from Netherlands East India and the Malay-Peninsular is distributed from there over the whole world.

Technically gambir is used as a dye (more specially for silk and millitary equipments), for tanning fishing nets and particularly for tanning leather, for which it is of great utility as it penetrates the hide very quickly and consequently prevents its decaying. Also with a view to the colour it imparts to the leather, it is better however, to use gambir only combined with some slower acting tanning material. Gambir is also used in breweries for clarifying beer. Medically it serves as an astringent; gambir is specially recommended as a cure for hoarseness and affections of the larynx.

K. Heijne.